

REMARKS

The Office Action of March 21, 2008, has been received and reviewed.

Claims 1-69 and 142-207 are currently pending in the application. Of these, claims 3, 9, 32, 38, 50 and 54 have been withdrawn from consideration, while claims 1, 2, 4-8, 10-31, 33-37, 39-49, 51-53, 55-69 and 142-207 have been considered. Claims 142-207 have been allowed, claims 17-19, 40-42, 57-59 are drawn to allowable subject matter, and claims 1, 2, 4-8, 10-16, 20-31, 33-37, 39, 43-49, 51-53, 55, 56, and 60-69 have been rejected.

Reconsideration of the above-referenced application is respectfully requested.

Drawings

It has been asserted that the drawings do not show "a flip-chip BGA having a conductive center surrounded by a first member." Office Action of March 21, 2008, page 2. An embodiment of a semiconductor device 10 that may be considered to include each of these features is shown in FIG. 4 and in FIG. 6. Specifically, FIGs. 4 and 6 show an embodiment of a semiconductor device 10 with male members 40 of electrical connectors protruding from its surface 14. *See also*, page 12, lines 10-26. Each male member 40 includes a conductive center 46 surrounded by a jacket 42. *See also, id.*

Thus, there is no need for corrected drawings. Accordingly, the objection to the drawings under 37 C.F.R. § 1.83(a) should be withdrawn.

Rejections under 35 U.S.C. § 103(a)

Claims 1, 2, 4-8, 10-16, 20-25, 26-31, 33-37, 39, 43-49, 51-53, 55, 56, and 60-69 have been rejected under 35 U.S.C. § 103(a).

There are several requirements in establishing a *prima facie* case of obviousness against the claims of a patent application. All of the limitations of the claim must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 985 (CCPA 1974); *see also* MPEP § 2143.03. Even then, a claim "is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ2d 1396 (2007). The Office must also establish that one of ordinary skill in the art would have had a reasonable

expectation of success that the purported modification or combination of reference teachings would have been successful. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). There must also be “an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR* at 1396. That reason must be found in the prior art, common knowledge, or derived from the nature of the problem itself, and not based on the Applicant’s disclosure. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C. H. Patrick Co.*, 464 F.3d 1356, 1367 (Fed. Cir. 2006). A mere conclusory statement that one of ordinary skill in the art would have been motivated to combine or modify reference teachings will not suffice. *KSR* at 1396.

Subrahmanyam

Claims 1, 2, 4-8, 10-16, 20-24, 26-31, 33-37, 39, 43-49, 51-53, 55, 56, 60-65, and 67-69 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter which is allegedly unpatentable over the subject matter taught in U.S. Patent 5,411,400 to Subrahmanyam et al. (hereinafter “Subrahmanyam”).

The teachings of Subrahmanyam relate to connectors for electrically coupling two components of an electronic device to one another. Such a connector includes an insert 12 that protrudes from one of the electronic components and a socket 14 that protrudes from the other electronic component. FIG. 1; col. 3, lines 2-4. As taught at col. 2, line 68, to col. 3, line 2 of Subrahmanyam, *the socket 14 is formed from a conductive material*. See also, col. 4, lines 30-47; col. 4, line 65, to col. 5, line 17; col. 5, lines 42-59. The insert 12 is likewise formed from a conductive material. See, e.g., col. 4, lines 48-64; col. 5, lines 18-41.

As shown in FIGs. 6 and 9 of Subrahmanyam, each insert 12, 41 is a solid structure, including a cylindrical base 32 and a flanged circular head 37. See also col. 5, lines 40-41. FIGs. 7 and 9 of Subrahmanyam depict each socket 14, 42 as including a solid pedestal 29 upon which a sectioned ring 34 is disposed, with a flanged head 39 being located on an upper edge of the sectioned ring 34. See also col. 5, lines 56-57.

It is respectfully submitted that Subrahmanyam does not teach or suggest a socket 14, 42 that comprises a dielectric material, as is required of the female member of the conductive

structure of independent claim 1, as amended herein. To the contrary, the teachings of Subrahmanyam limit the material from which the socket 14, 42 may be formed to “conductive materials.” *See, e.g.*, col. 2, line 68, to col. 3, line 2.

In addition, it is respectfully submitted that Subrahmanyam includes no express or inherent description of a female member with “a conductive center partially filling [an] aperture” of the female member. Rather, the socket 14, 42 of Subrahmanyam includes a sectioned ring 34 that sits upon (*i.e.*, on top of) a planar surface of a metal pedestal 29. Col. 4, lines 37-47; FIGs. 8 and 9; col. 5, line 60, to col. 6, line 9. Since the disclosure of Subrahmanyam is limited to a pedestal 29 with a planar surface and a socket 14, 42 with a sectioned ring 34 that sits atop the planar surface of the pedestal 29, it is apparent that Subrahmanyam also lacks any teaching or suggestion that at least a portion of an outer periphery of the pedestal 29 is laterally surrounded by the sectioned ring 34 or confined within an aperture of the sectioned ring 34, as are required of the female member of the conductive structure to which amended independent claim 1 is directed.

Furthermore, Subrahmanyam provides no teaching or suggestion of an insert 12, 41 that includes “an aperture configured to be located over [a] corresponding contact pad” and “a conductive center substantially filling [the] aperture,” as recited in independent claim 1. Rather, as evidenced by the cross-sectional representation provided in FIGs. 6 and 9 of Subrahmanyam, the teachings of Subrahmanyam are limited to inserts 12, 41 with bases 32 and heads 37 that are solid.

Accordingly, it is respectfully submitted that the teachings and suggestions of Subrahmanyam do not support a *prima facie* case of obviousness against the subject matter recited in independent claim 1, as would be required to maintain the 35 U.S.C. § 103(a) rejection of independent claim 1.

Claims 2, 4-8, 10-16, 20, and 21 are each allowable, among other reasons, for depending directly or indirectly from independent claim 1, which is allowable.

Claim 2 is further allowable because Subrahmanyam does not teach or suggest that the aperture of the socket 14, 42 described therein is “configured to partially limit insertion of [the

insert 12, 41] thereinto.” To the contrary, FIGs. 7 and 9 depict the aperture of the socket 14, 42 as including smooth walls that are oriented perpendicular to the underlying pedestal 29.

Claim 5 is further allowable since Subrahmanyam includes no teaching or suggestion that the outer surface of the insert 12, 41 thereof “is configured to partially limit insertion” of the insert 12, 41 into the aperture of the socket 14, 42.

Claim 8 is additionally allowable because Subrahmanyam does not teach or suggest a male member with an end portion having a smaller periphery than a base portion of the male member. Rather, the description of Subrahmanyam is limited to an insert 12, 41 with a circular head 37 that has a smaller periphery at its end than at a base of the circular head 37. Nonetheless, the outer periphery of the end of the circular head 37 appears to be the same size as the outer periphery of the base of the cylindrical base 32 of the insert 12, 41.

Claim 10 is further allowable since Subrahmanyam includes no teaching or suggestion that either the insert 12, 41 or the socket 14, 42 thereof comprises photopolymer. It is also submitted that, because the teachings of Subrahmanyam are limited to use of conductive materials to form the insert 12, 41 and the socket 14, 42, one of ordinary skill in the art wouldn’t have been motivated to modify teachings from Subrahmanyam in such a way as to render the subject matter recited in claim 10 obvious.

Claim 11 depends from claim 10, and is also allowable since Subrahmanyam provides no teaching or suggestion of an insert 12, 41 or socket 14, 42 that comprises a plurality of layers of photopolymer. Nor would one of ordinary skill in the art been motivated to modify the teachings of Subrahmanyam in such a way as to develop a structure that includes a plurality of layers of photopolymer.

Claim 20 is also allowable since Subrahmanyam includes no teaching or suggestion of an insert 12, 41 or a socket 14, 42 that includes thermoplastic conductive elastomer.

With respect to the semiconductor device component to which amended independent claim 22 is directed, it is respectfully submitted that Subrahmanyam lacks any teaching or suggestion of “a first member of an alignment structure *secured directly to* and protruding from... at least one contact pad...” (emphasis supplied).

Subrahmanyam also lacks any teaching or suggestion of “a first member of an alignment structure... including an aperture through a length thereof” and “a conductive center in [the] aperture . . .” Again, it is respectfully submitted that the insert 12, 41 of Subrahmanyam does not include any feature that could be considered to comprise an aperture. Further, Subrahmanyam does not teach or suggest that any conductive material may be located within the aperture defined by the sectioned ring 34 and flanged head 39 of the socket 14, 42. More specifically, the metal pedestal 29 disclosed in Subrahmanyam does not include an outer periphery that is laterally surrounded by any portion of the sectioned ring 34, laterally confined within at least a base portion of an aperture of the sectioned ring 34, or otherwise disposed within the aperture of the sectioned ring 34.

As such, a *prima facie* case of obviousness has not been established, as would be required to maintain the 35 U.S.C. § 103(a) rejection of independent claim 22.

Each of claims 23, 24, 26-31, 33-37, 39, and 43-46 is allowable, among other reasons, for depending directly or indirectly from independent claim 22, which is allowable.

Claim 28 is additionally allowable since Subrahmanyam lacks any teaching or suggestion of a member of an alignment structure that is configured to contain conductive material over at least one contact pad.

Claim 29 is further allowable because Subrahmanyam does not teach or suggest a member of an alignment structure with an aperture that is substantially filled by a conductive center.

Claim 31 is also allowable because Subrahmanyam does not teach or suggest a male member with an end portion that has a smaller periphery than a base portion of the male member. Rather, the description of Subrahmanyam is limited to an insert 12, 41 with a circular head 37 that has a smaller periphery at its end than at a base of the circular head 37. Nonetheless, the outer periphery of the end of the circular head 37 appears to be the same size as the outer periphery of the base of the cylindrical base 32 of the insert 12, 41.

Claim 35 is further allowable since Subrahmanyam does not teach or suggest a member of an alignment structure that includes an aperture that is partially filled by a conductive center.

Claim 43 is also allowable since Subrahmanyam includes no teaching or suggestion of an insert 12, 41 or a socket 14, 42 that includes thermoplastic conductive elastomer.

Claim 45 is further allowable since Subrahmanyam includes no teaching or suggestion that either the insert 12, 41 or the socket 14, 42 thereof includes any feature that comprises a photopolymer. It is also submitted that, because the teachings of Subrahmanyam are limited to use of conductive materials to form the insert 12, 41 and the socket 14, 42, one of ordinary skill in the art wouldn't have been motivated to modify teachings from Subrahmanyam in such a way as to render the subject matter recited in claim 45 obvious.

Claim 46 depends from claim 45, and is also allowable since Subrahmanyam provides no teaching or suggestion of an insert 12, 41 or socket 14, 42 with any feature that comprises a plurality of layers of photopolymer. Nor would one of ordinary skill in the art been motivated to modify the teachings of Subrahmanyam in such a way as to develop a feature that includes a plurality of layers of photopolymer.

Independent claim 47, as amended herein, is drawn to a semiconductor device assembly that includes a conductive structure with a first member and a second member. The first member, which is secured directly to and protrudes from a substrate or a substrate, comprises dielectric material. An aperture extends through the first member. A conductive center, which includes an outer periphery that is at least partially laterally surrounded by the first member, is located within the aperture. The second member, which is configured to be interconnected with the first member, is secured directly to and protrudes from the other of the semiconductor device and the substrate. The second member also includes an aperture therethrough. Another conductive center is located within the aperture of the second member.

It is respectfully submitted Subrahmanyam does not expressly or inherently describe each and every element of amended independent claim 47. In particular, neither the insert 12, 41 nor the socket 14, 42 of Subrahmanyam comprises dielectric material. Subrahmanyam instead teaches that both of these elements are formed completely from conductive material.

It is also respectfully submitted that the insert 12, 41 of Subrahmanyam lacks an aperture, while the socket 14, 42 of Subrahmanyam does not include "a conductive center" *within an aperture* defined by the sectioned ring 34 and flanged head 39 thereof. More particularly, the

sectioned ring 34 of the socket 14, 42 of Subrahmanyam does not laterally surround any portion of the metal pedestal 29 over which the sectioned ring 34 is disposed.

Therefore, it is respectfully submitted that the teachings of Subrahmanyam do not support a *prima facie* case of obviousness against amended independent claim 47.

Each of claims 48, 49, 51-53, 55, 56, 60-65, and 67-69 is allowable, among other reasons, for depending directly or indirectly from independent claim 47, which is allowable.

Claim 49 is additionally allowable because Subrahmanyam includes no teaching or suggestion of a member with an aperture that includes an upper portion with a smaller periphery than a base portion of the aperture. Instead, as shown in FIGs. 7 and 9, the upper portion of the periphery of the aperture of the socket 14, 42 is larger than the periphery of the base of the socket's aperture.

Claim 52 is further allowable because Subrahmanyam neither teaches nor suggests that the aperture of the socket 14, 42 described therein is "configured to limit a distance the [insert 12, 41] is inserted into [the aperture]." To the contrary, FIGs. 7 and 9 depict the aperture of the socket 14, 42 as including smooth walls that are oriented perpendicular to the underlying pedestal 29.

Claim 53 is additionally allowable because Subrahmanyam does not teach or suggest that the insert 12, 41 has an end portion with a smaller periphery than a base portion thereof. Rather, the description of Subrahmanyam is limited to an insert 12, 41 with a circular head 37 that has a smaller periphery at its end than at a base of the circular head 37. Nonetheless, the outer periphery of the end of the circular head 37 appears to be the same size as the outer periphery of the base of the cylindrical base 32 of the insert 12, 41.

Claim 60 is also allowable since Subrahmanyam includes no teaching or suggestion of an insert 12, 41 or a socket 14, 42 that includes thermoplastic conductive elastomer.

Claim 62 is further allowable since Subrahmanyam includes no teaching or suggestion that either the insert 12, 41 or the socket 14, 42 thereof includes any feature that comprises a photopolymer. It is also submitted that, because the teachings of Subrahmanyam are limited to use of conductive materials to form the insert 12, 41 and the socket 14, 42, one of ordinary skill

in the art wouldn't have been motivated to modify teachings from Subrahmanyam in such a way as to render the subject matter recited in claim 62 obvious.

Claim 63 depends from claim 62, and is also allowable since Subrahmanyam provides no teaching or suggestion of an insert 12, 41 or socket 14, 42 with any feature that comprises a plurality of layers of photopolymer. Nor would one of ordinary skill in the art been motivated to modify the teachings of Subrahmanyam in such a way as to develop a feature that includes a plurality of layers of photopolymer.

Subrahmanyam in View of Abe

Claims 25 and 66 have been rejected under 35 U.S.C. § 103(a) for being directed to subject matter that is assertedly unpatentable over the teachings of Subrahmanyam, in view of teachings from U.S. Patent 5,646,442 to Abe et al. (hereinafter "Abe").

Claim 25 is allowable, among other reasons, for depending indirectly from independent claim 22, which is allowable.

Claim 66 is allowable, among other reasons, for depending indirectly from independent claim 47, which is allowable.

Withdrawal of the 35 U.S.C. § 103(a) rejections of claims 1, 2, 4-8, 10-16, 20-25, 26-31, 33-37, 39, 43-49, 51-53, 55, 56, and 60-69 is respectfully solicited, as is the allowance of each of these claims.

Allowed Claims

The allowance of claims 142-207 is gratefully acknowledged, as is the indication that claims 17-19, 40-42, and 57-59 are drawn to allowable subject matter.

Election of Species Requirement

It is respectfully submitted that independent claims 1, 22, and 47 remain generic to all of the species of invention that were identified in the Election of Species Requirement in the

above-referenced application. In view of the allowability of these claims, claims 3, 9, 32, 38, 50 and 54, which have been withdrawn from consideration, should also be considered and allowed. M.P.E.P. § 806.04(d).

CONCLUSION

It is respectfully submitted that each of claims 1-69 and 142-207 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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